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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,430	08/14/2001	Kazuyuki Nitta	2001-1143A	8121

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WASHINGTON, DC 20006-1021

EXAMINER

LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 05/05/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/928,430

Applicant(s)

NITTA ET AL.

Examiner

Rosemary E. Ashton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe in view of Ohsawa and further in view of Blakeney for the reasons stated in paragraphs 3 and 4 in paper no. 4. This rejection is maintained from the prior office action.

Response to Arguments

3. Applicant's arguments filed February 6, 2003 have been fully considered but they are not persuasive.

Applicant argues that the rejection is based on inherency, however, this is not the case. As stated in the prior rejection Blakeney teaches the purpose of a post development heating step is to increase adhesion and chemical resistance of the resist composition and to improve the resist thermal flow temperature. As stated in Blakeney columns 2 and 10:

Post development cure treatments of the resist, such as DUV cure or stepped-up post baking cycles are sometimes necessary to apply to improve the resist thermal flow temperature.

A post-development heat treatment or bake may then be employed to increase the coating's adhesion and chemical resistance to etching solutions and other substances.

Thus, the post development step aids in the overall pattern stability of the patterned photoresist composition.

4. Applicant's arguments with respect to claims 1,5-10 have been considered but are moot in view of the new ground(s) of rejection.

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5. Claims 1,5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oomori et al U.S. patent no. 5,976,760 in view of Watanabe et al U.S. patent no. 5,876,900 cited in the prior office action.

As shown in example 1 below Oomori teaches a positive photoresist composition comprising 100 parts by weight (pbw) of a polymer mixture containing 25 pbw of a polyhydroxystyrene having phenolic hydrogens replaced with a tertiary alkoxy carbonyl group (applicant's A2) and 75 pbw of polyhydroxystyrene having phenolic hydrogens replaced with an alkoxyalkyl group (applicant's A1). The composition comprises 3 pbw of an oxime sulfonate photoacid generator, 0.06 pbw of the amine compound triethylamine and 0.06 pbw of the carboxylic acid salicylic acid.

EXAMPLE 1

A chemical-sensitization positive-working resist composition was prepared by dissolving, in 400 parts by weight of propyleneglycol monomethyl ether acetate, 25 parts by weight of a first polyhydroxystyrene resin having a weight-average molecular weight of 12000 with a molecular weight distribution $M_w:M_n$ of 4.6, which was substituted by tert-butyloxycarbonyl groups for 39% of the hydroxyl groups, 75 parts by weight of a second polyhydroxystyrene resin having a weight-average molecular weight of 12000 with a molecular weight distribution $M_w:M_n$ of 4.6, which was substituted by ethoxyethyl groups for 39% of the hydroxyl groups, 3 parts by weight of the oximesulfonate compound prepared in Preparation 1 described above, i.e. α -(1-naphthylsulfonyloxyimino)-4-methoxybenzyl cyanide, as the acid-generating agent, 0.06 part by weight of triethylamine and 0.06 part by weight of salicylic acid followed by filtration of the solution through a membrane filter of 0.2 μ m pore diameter.

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Oomori does not teach the positive photoresist composition has a polyvinyl ether as claimed.

As stated in the prior office action Watanabe teaches a positive photoresist composition comprising a polyhydroxystyrene polymer having phenolic hydrogens replaced with acid labile groups, a photoacid generator, an amine and a polyvinyl ether. Watanabe teaches the polyvinyl ether is used in the composition for the purpose of dissolution control (col. 2, line 1) and as stated in col. 3, lines 12-20 below.

The resist composition not only has an increased dissolution contrast owing to the function of an acid labile group contained in the base resin of formula (1) and the function of a vinyl ether group capable of chemically converting into an acid labile group through heat cross-linking, but is also improved in heat resistance during etching because the crosslinked structure is maintained in unexposed areas.

Thus, it would have been obvious to one of ordinary skill in the art to add a polyvinyl ether compound to the photoresist composition of Oomori with a reasonable expectation of obtaining a chemically amplified positive resist composition having improved performance and improved heat resistance upon etching because Watanabe teaches a composition having the combination of a polyhydroxystyrene having acid labile groups and a polyvinyl ether gives these results (col. 3, lines 36-40).

As to using a tertiary alkanol amine as in claim 10 Watanabe teaches the exemplified triethylamine is equivalent to triethanolamine and thus an obvious alternative reagent in the composition (col. 24, lines 27-31).

Preferred among others are triethylamine, N,N-dimethylaniline, N-methylpyrrolidone, pyridine, quinoline, nicotinic acid, triethanolamine, piperidine ethanol, N,N-dimethylacetamide, and succinimide.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 308-2057. The

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examiner works a flexible work schedule and can normally be reached M-F between 10:00 am and 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Rosemary E. Ashton
Primary Examiner
Art Unit 1752

rea
April 30, 2003

**ROSEMARY ASHTON
PRIMARY EXAMINER**